

IN THE CLAIMS:

Please amend claims 1, 3, 5, 20 and 24, and 28 as follows.

1. (Currently Amended) An image processing device comprising:

an image pick-up device having a fixed positional relationship with respect to a measurement object;

an orientation sensor ~~for measuring~~ adapted to measure the orientation at an image pick-up visual point of said image pick-up device;

a storage unit adapted to store calculation information to calculate the orientation ~~and/or of said measurement object or the~~ position of said measurement object on the basis of an output from said orientation sensor;

a prediction position calculation unit adapted to calculate a prediction position of an index in an image picked-up by said image pick-up device on the basis of the measured orientation;

a target image setting unit adapted to ~~obtain a prediction position of an index in an image picked-up by said image pick-up device using a measured value from said orientation sensor and said calculation information stored in said storage unit, generate an image with a peripheral area around said prediction position in said picked-up image subjected to a rotational process on the basis of a rotational angle in a roll direction of said image pick-up device derived from said measured value, and output said generated image as a target image~~ extract an image area of the index from the picked-up image on the basis of the prediction position of the index, rotate the extracted image area using a roll angle, according to the measured orientation, of said image pick-up device, and output the rotated image area as a target image;

a detecting unit adapted to detect the position of said index in said target image by performing a template matching process between a template image of said index and said target image;

an updating unit adapted to update said calculation information stored in said storage unit on the basis of a detected position of said index detected by said detecting unit; and

a calculation unit adapted to calculate the orientation and/or position of said measurement object on the basis of ~~said~~ a measured value from said orientation sensor and said calculation information updated by said updating unit.

2. (Cancelled)

3. (Currently Amended): The image processing device according to claim 1, wherein said calculation information is the correction information to correct for an error in the measured value of ~~attitude~~ the orientation measured by said ~~attitude~~ orientation sensor, and said calculation unit calculates the ~~attitude~~ orientation of said measurement object on the basis of said measured value and said correction information.

4. (Cancelled)

5. (Currently Amended) The image processing device according to claim 1, wherein said calculation information is the correction information to correct for an error in the measured value of ~~attitude~~ the orientation measured by said ~~attitude~~ orientation sensor and the position information of the image pick-up visual point of said image pickup device,

and said calculation unit calculates the position and ~~attitude~~ orientation of said measurement object on the basis of said measured value, said correction information and said position information.

6. (Cancelled)

7. (Previously Presented) The image processing device according to claim 5, wherein said updating unit updates the position information in the two directions except for a depth direction in the camera coordinate system of said image pickup device, even when an index of only a single point is detected in said detecting unit.

8. (Previously Presented) The image processing device according to claim 3, wherein said correction information is the information to correct for an error in the azimuth direction among the measured values of the attitude measured by said attitude sensor.

9. (Previously Presented) The image processing device according to claim 1, wherein said updating unit updates said calculation information on the basis of the detected position of said index in said picked-up image.

10. (Previously Presented) The image processing device according to claim 3, wherein said updating unit updates said calculation information on the basis of a typical value of the updated value of said calculation information obtained for each index when a plurality of indices are detected in said detecting unit.

11. (Previously Presented) The image processing device according to claim 3, wherein said updating unit updates said calculation information on the basis of a dislocation between the prediction position and said detected position of said index in said target image.

12. (Previously Presented) The image processing device according to claim 11, wherein said updating unit updates said calculation information on the basis of a typical value of said dislocation obtained for each index when a plurality of indices are detected in said detecting unit.

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Previously Presented) The image processing device according to claim 1, wherein said measurement object is an image pick-up visual point of said image pick-up device and said image processing device further comprises a display unit adapted to display said pick-up image with the image in the virtual space superposed thereon on the basis of the orientation of position and orientation of said image pick-up device calculated by said calculation unit.

18. (Cancelled)

19. (Previously Presented) The image processing device according to claim 1, wherein said measurement object is a visual point of the observer, and said image processing device further comprises a display unit adapted to display the image in the virtual space drawn on the basis of the orientation or position and orientation of the observer calculated by said calculation unit on a display screen, while optically transmitting the image in the real space through said display screen observed by the observer.

20. (Currently Amended) An image processing device in which the position of an index in a picked-up image picked up by an image pick-up device is detected by template matching employing a template image of said index, comprising:

an orientation sensor for measuring the orientation at an image pick-up visual point of said image pick-up device;

~~a target image creating unit adapted to create a target image having a peripheral area around a prediction position in said picked-up image subjected to a rotational process on the basis of the rotational angle in a roll direction from said measured value by obtaining said prediction position of the index in said picked-up image, using the measured value of said orientation measured by said orientation sensor, and outputting the target image; and~~

a prediction position calculation unit adapted to calculate a prediction position of the index in an image picked-up by the image pick-up device on the basis of the measured orientation;

a target image creating unit adapted to extract an image area of the index from the picked-up image on the basis of the prediction position of the index, rotate the extracted image area using a roll angle, according to the measured orientation, of said image pick-up device, and output the rotated image area as a target image; and

a detecting unit adapted to detect the position of said index in said picked-up image by performing a template matching process between said template image and said target image.

21. (Cancelled)

22. (Cancelled)

23. (Cancelled)

24. (Currently Amended) An image processing method comprising:

an image pick-up step, of picking up an image with an image pick-up device having a fixed positional relationship with respect to a measurement object;

an orientation measuring step, of measuring the orientation at an image pick-up visual point of the image pick-up device;

a storage step, of storing calculation information to calculate the orientation ~~and/or~~ of the measurement object or the position of the measurement object on the basis of the measured value measured in said orientation measuring step;

a prediction position calculation step of calculating a prediction position of an index in an image picked-up by said image pick-up step on the basis of the measured orientation measured in said orientation measuring step;

a target image setting step, of setting a target image that is an object for detecting a predetermined index on the basis of the picked-up image of extracting an image area of the index from the picked-up image on the basis of the prediction position of the index, rotating the extracted image area using a roll angle, according to the measured orientation, of the image pick-up device, and outputting the rotated image area as a target image;

a detecting step, of detecting the position of the index in the target image by performing a template matching process between a template image of the index and the target image;

an updating step, of updating the calculation information stored in said storage step, on the basis of a detected position of the index detected in said detecting step; and

a calculating step, of calculating the orientation and/or position of the measurement object on the basis of ~~the~~ a measured value from said orientation measuring step and the calculation information updated in said updating step.

25. (Cancelled)

26. (Previously Presented) A program code for executing the image processing method according to claim 24.

27. (Previously Presented) A storage medium storing the program code according to claim 26.

28. (Currently Amended) An image processing method for use with an image processing device in which the position of an index in a picked-up image picked up by an image pick-up device is detected by template matching employing a template image of said index, said method comprising:

an orientation measuring step of measuring the orientation at an image pick-up visual point of the image pick-up device;

~~a target image creating step of creating a target image having a peripheral area around a prediction position in the picked-up image subjected to a rotational process on the basis of the rotational angle in a roll direction from the measured value by obtaining the prediction position of the index in the picked-up image using the measured value of orientation measured in said orientation measuring step, and outputting the target image;~~
and

a prediction position calculating step of calculating a prediction position of the index in the image picked-up by the image pick-up device on the basis of the measured orientation measured in said orientation measuring step;

a target image creating step of extracting an image area of the index from the picked-up image on the basis of the prediction position of the index, rotating the extracted image area using a roll angle, according to the measured orientation, of the image pick-up device, and outputting the rotated image area as a target image; and

a detecting step of detecting the position of ~~said~~ the index in ~~said~~ the picked-up image by performing a template matching process between ~~said~~ the template image and ~~said~~ the target image.